

CLAIMS:

1. A method of forming a security device including:

providing a sheet including a substantially transparent or translucent layer and a reflective layer, the layers being in permanently fixed disposition to each other within the sheet, at least part of the reflective layer being visible through at least a portion of the transparent or translucent layer from a first side of the sheet; and

blind embossing the sheet at least partly within said portion from the first side of the sheet, through the transparent or translucent layer and onto the reflective layer to form a transitory embossed image within said portion.

2. A method of forming a security device according to claim 1, wherein the transitory embossed image is visible at viewing angles within a range of angles of high reflection.

3. A method of forming a security device including: providing a sheet including a substantially transparent or translucent layer and a reflective layer, at least part of which is visible through at least a portion of the transparent or translucent layer from a first side of the sheet, the portion of the transparent or translucent layer being defined by only partly opacifying the sheet to form a window in the sheet; and blind embossing the sheet at least partly within the window from the first side of the sheet, through the transparent or translucent layer and onto the reflective layer to form a transitory embossed image at least partly within said window.

4. A method of forming a security device including: providing a sheet including a substantially transparent or translucent layer and a reflective layer, at least part of which is visible through at least a portion of the transparent or translucent layer on a first side of the sheet; blind embossing the sheet at least partly within said portion, from the first side of the sheet, through the transparent or translucent layer and onto the reflective layer to form a transitory embossed

image within said portion; and only partly opacifying the sheet to define said portion of the transparent or translucent layer as a window in the sheet.

- 5 5. A method of forming a security device including providing a substantially transparent or translucent layer, blind embossing from a first side of the substantially transparent or translucent layer through the transparent or translucent layer to produce an embossment in the layer;

10 applying a reflective layer to the other side of said substantially transparent or translucent layer at least in part register with the embossment, thereby resulting in a transitory embossed image in the reflective layer visible through the transparent or translucent layer at least at some viewing angles.

6. A method according to any one of the preceding claims wherein one or more opacifying layers are applied to the first side of the sheet except in the region of said portion of the transparent or translucent layer, thereby forming a window on the first side of the sheet.

- 15 7. A method according to claim 6, wherein the second side of the sheet is opacified except in the region of said portion of the transparent or translucent layer to form a window on the second side of the sheet in register with the window formed on the first side of the sheet.

20 8. A method according to claim 6 wherein the second side of the sheet is opacified in the region of said portion of the transparent or translucent layer to cover the reflective layer on the second side of the sheet.

25 9. A method according to any one of the preceding claims wherein the substantially transparent or translucent layer comprises transparent polymeric substrate with the reflective layer applied to one side or embedded into the polymeric substrate.

10. A method according to any one of claims 1 to 4 wherein the substantially transparent or translucent layer comprises a coating applied to a substrate.

11. A method according to claim 10 wherein the substrate constitutes the reflective layer.

12. A method according to any one of the preceding claims wherein the reflective layer comprises a layer of foil.

5 13. A method according to claim 10 wherein the coating is applied to the substrate, over the reflective layer to sandwich the reflective layer between the coating and the substrate.

14. A method according to any one of claims 1 to 10 or claim 13 wherein the reflective layer is formed by printing with reflective ink.

10 15. A method according to claim 14 wherein the reflective ink comprises a highly reflective metallic ink, such as a silver or gold metallic ink, or a nacreous or pearlescent pigment, such as iriodin.

16. A method according to any one of claims 1 to 10 or claim 13 wherein the reflective layer comprises metallic material applied to a substrate such as by
15 sputtering or a vapour deposition process.

17. A method according to claim 14 wherein the reflective ink is of the type comprising an optically variable pigment which provides a colour shift between two distinct colours with the colour shift being dependent upon the viewing angle.

20 18. A method according to any one of the preceding claims wherein the blind embossing is conducted by a stamping operation.

19. A method according to any one of claims 1 to 17 wherein the blind embossing is conducted by the process of intaglio printing without ink.

20. A security device comprising a sheet including: a reflective layer; a
25 substantially transparent or translucent layer, the layers being in permanently fixed disposition to each other within the sheet; a blind embossed transitory image

formed through the substantially transparent or translucent layer onto the reflective layer, at least part of which is visible through the transparent or translucent layer at least at some viewing angles.

21. A security device according to claim 20 wherein the transitory
5 embossed image is visible at viewing angles within a range of angles of high reflection.

22. A security device according to claim 20 or claim 21 wherein at least one side of the sheet is partly opacified to define a window in the sheet, the transitory image being disposed at least partly within the window.

10 23. A security device according to claim 22 wherein the reflective layer and the embossed transitory image extend over at least part of the window and over part of an opaque region surrounding or adjacent to the window.

24. A security device according to claim 23 wherein one or more opacifying layers are applied partly to a first side of the sheet to create a window in
15 said first side.

25. A security device according to claim 24 wherein the second side of the sheet is partly opacified to form a window in said second side in register with the window formed on the first side of the sheet.

26. A security device according to claim 24 wherein the second side of
20 the sheet is opacified in the region of the reflective layer to cover the reflective layer on the second side of the sheet.

27. A security device according to any one of claims 20 to 26 wherein the substantially transparent or translucent layer comprises transparent polymeric material with the reflective layer applied to one side or embedded into the
25 polymeric material.

28. A security device according to any one of claims 20 to 26 wherein the substantially transparent or translucent layer comprises a coating applied to a substrate.

29. A security device according to claim 28 wherein the coating is
5 applied to a substrate, over the reflective layer to sandwich the reflective layer between the coating and the substrate.

30. A security device according to claim 29 wherein the substrate constitutes the reflective layer.

31. A security device according to any one of claims 20 to 30 wherein
10 the reflective layer comprises a layer of foil.

32. A security device according to any one of claims 20 to 29 wherein the reflective layer is a layer of printed reflective ink.

33. A security device according to claim 32 wherein the reflective ink comprises a highly reflective metallic ink, such as silver or gold metallic ink, or a
15 nacreous or pearlescent pigment, such as iriodin.

34. A security device according to claim 32 wherein the reflective ink is
of the type comprising an optically variable pigment which provides a colour shift between two distinct colours with the colour shift being dependent upon the viewing angle.

35. A method or a security device according to any one of the preceding claims wherein the transitory embossed image comprises at least one set of lines or dots.
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36. A method or security device according to claim 35 wherein the transitory embossed image includes a first set of embossed lines or dots
25 extending in one direction, and a second set of embossed lines or dots extending in a different direction.

37. A method or security device according to claim 36 wherein the second set of embossed lines or dots extends substantially perpendicularly to the first set of embossed lines or dots.

38. A method or security device according to any one of claims 1 to 34
5 wherein the transitory embossed image comprises a first embossing having a predetermined feature and a second embossing of smaller dimensions formed on said predetermined feature of said first embossing, said first embossing being formed to hide and reveal said second embossing at predetermined viewing angles.

10 39. A method or security device according to claim 38 wherein the first embossing comprises a set of spaced first features having sides and the second embossing is formed on the sides of the first features.

40. A method or security device according to claim 39 wherein the set of spaced first features comprises a set of spaced parallel lines.

15 41. A method or security device according to any one of claims 38 to 40 wherein the second embossing comprises a first set of image embossings disposed on corresponding first sides of the first features and a second set of image embossings disposed on corresponding second sides of the first features to
20 form a first image corresponding to the first set of image embossings at a viewing angle facing the first sides and to form a second image corresponding to the second set of image embossings at a viewing angle facing the second sides.

42. A method or security device according to claim 41 wherein the first image is different from the second image.

25 43. A method or security device according to claim 38 wherein the first embossing comprises a set of spaced first features having sides with lower portions of the first embossing being disposed between the spaced first features, the second embossing being formed between the first features on the lower portions.

44. A method or security device according to any one of the preceding claims wherein the sheet comprises a security document or article, and the reflective layer is disposed in a patch or a specific region on the document or article.

5 45. A method of forming a security device including:

providing a sheet including a reflective layer;

blind embossing the sheet in the region of the reflective layer to form a transitory embossed image;

10 wherein the transitory embossed image comprises a first embossing having a predetermined feature and a second embossing of smaller dimensions formed on said predetermined feature of said first embossing, said first embossing being formed to hide and reveal said second embossing at predetermined viewing angles.

15 46. A method according to claim 45 wherein the sheet includes a substrate and the sheet is embossed through the substrate and onto the reflective layer.

47. A method according to claim 46 wherein the substrate includes a transparent or translucent layer and the reflective layer is visible through the transparent or translucent layer .

20 48. A method according to any one of claims 45 to 47 wherein the sheet is only partly opacified to define a window in the sheet, the transitory image being disposed at least partly within the window.

49. A method according to claim 47 wherein the substantially transparent or translucent layer comprises a transparent polymeric substrate.

50. A method according to any one of claims 45 to 49 wherein one or more opacifying layers are applied to a first side of the sheet except in the region of the reflective layer to form a window on the first side of the sheet.

51. A method according to claim 50 wherein a second side of the sheet
5 is opacified except in the region of the reflective layers to form a window on the second side of the sheet in register with the window formed on the first side of the sheet.

52. A method according to claim 50 wherein the second side of the sheet
10 is opacified in the region of the reflective layer to cover the reflective layer on the second side of the sheet.

53. A method according to any one of claims 45 to 52 wherein the reflective layer is formed by printing with reflective ink.

54. A method according to claim 53 wherein the reflective ink comprises
15 a highly reflective metallic ink, such as silver or gold metallic ink, or a nacreous or pearlescent pigment, such as iriodin.

55. A method according to claim 53 wherein the reflective ink is of the type comprising an optically variable pigment which provides a colour shift between two distinct colours with the colour shift being dependent upon the viewing angle.

20 56. A method according to any one of claims 45 to 55 wherein the blind embossing is conducted by a stamping operation.

57. A method according to any one of claims 45 to 55 wherein the blind embossing is conducted by the process of intaglio printing without ink.

25 58. A method according to claim 56 or claim 57 wherein the blind embossing process uses a stamping or intaglio printing plate having engravings corresponding to the first and second embossings, said engravings being formed by a laser engraving process.

59. A method according to any one of claims 45 to 55 wherein the blind embossing is conducted by a laser engraving process.

60. A security device comprising:

5 a sheet including a reflective layer, and a blind embossed transitory image formed in the sheet in the region of the reflective layer,

wherein the transitory embossed image comprises a first embossing having a predetermined feature and a second embossing of smaller dimensions formed on said predetermined feature of said first embossing, said first embossing being formed to hide and reveal said second embossing at predetermined viewing
10 angles.

61. A security device according to claim 60 wherein the sheet includes a substrate and the sheet is embossed through the transparent or translucent layer and onto the reflective layer.

62. A security device according to claim 61 wherein the substrate
15 includes a transparent or translucent layer and the reflective layer is visible through the transparent or translucent layer .

63. A security device according to any one of claims 60 to 62 wherein the sheet is only partly opacified to define a window in the sheet, the transitory image being disposed within the window.

20 64. A security device according to claim 62 wherein the substantially transparent or translucent layer comprises transparent polymeric substrate.

65. A security device according to any one of claims 60 to 64 including one or more opacifying layers applied to a first side of the sheet except in the region of the reflective layer to form a window.

25 66. A security device according to claim 65 including one or more opacifying layers applied to the second side of the sheet except in the region of

the reflective layer to form a window on the second side of the sheet in register with the window formed on the first side of the sheet.

67. A security device according to claim 65 wherein the second side of the sheet is opacified in the region of the reflective layer to cover the reflective
5 layer on the second side of the sheet.

68. A security device according to any one of claims 60 to 67 wherein the reflective layer is formed by a reflective printing ink.

69. A security device according to claim 68 wherein the reflective ink comprises a highly reflective metallic ink, such as silver or gold metallic ink, or a
10 nacreous or pearlescent pigment, such as iriodin.

70. A security device according to claim 68 wherein the reflective ink is of the type comprising an optically variable pigment which provides a colour shift between two distinct colours with the colour shift being dependent upon the viewing angle.

15 71. A method of forming a security device including: providing a substantially transparent or translucent layer; blind embossing the substantially transparent or translucent layer through the transparent or translucent layer to produce an embossment in the layer;

applying a reflective layer to the substantially transparent or translucent
20 layer at least in part register with the embossment,

wherein the transitory embossed image comprises a first embossing having a predetermined feature and a second embossing of smaller dimensions formed on said predetermined feature of said first embossing, said first embossing being formed to hide and reveal said second embossing at predetermined viewing
25 angles.

72. A method or security device according to any one of claims 45 to 71 wherein the first embossing comprises a set of spaced first features having sides and the second embossing is formed on the sides of the first features.

73. A method or security device according to claim 72 wherein the set of
5 spaced first features comprises a set of spaced parallel lines.

74. A method or security device according to claim 72 or claim 73 wherein the second embossing comprises a first set of image embossings disposed on corresponding first sides of the first features and a second set of image embossings disposed on corresponding second sides of the first features to
10 form a first image corresponding to the first set of image embossings at a viewing angle facing the first sides and to form a second image corresponding to the second set of image embossings at a viewing angle facing the second sides.

75. A method or security device according to claim 74 wherein the first image is different from the second image.

76. A method or security device according to any one of claims 45 to 71 wherein the first embossing comprises a set of spaced first features having sides with lower portions of the first embossing being disposed between the spaced first features, the second embossing being formed between the first features on the
15 lower portions.

77. A method or security device according to any one of claims 45 to 76 wherein the sheet comprises a security document or article, and the reflective layer is disposed in a patch or a specific region on the document or article.

78. A security document or device comprising: a substrate; a layer of optically variable pigment applied to an area of the substrate, wherein the optically
25 variable pigment provides a colour shift between two distinct colours with the colour shift being dependent upon the viewing angle; and an embossed transitory image formed by an embossing in the area of optically variable pigment, wherein

the embossed transitory image includes a first set of lines or dots extending in one direction and a second set of lines or dots extending in a different direction.

79. A security document or device according to claim 78 wherein the substrate includes a transparent or translucent window and the embossed
5 transitory image is disposed at least partly in the transparent or translucent window.

80. A security document or device according to claim 79 wherein the optically variable pigment and the embossed transitory image are applied over at least part of the transparent window and over part of an opaque region
10 surrounding or adjacent to the transparent window.

81. A security document or device according to claim 79 or claim 80 wherein the substrate is formed from a transparent plastics material to which at least one opacifying coating is applied to form the opaque region, except in the region of the transparent window.

15 82. A security documents or device according to any one of claims 78 to 79 wherein the optically variable pigment is applied to one side of the substrate and the opposite side of the substrate is embossed to form the embossed transitory image.

83. A security document or device according to any one of claims 78 to
20 82 wherein the first set of embossed lines or dots forms a background of the transitory embossed image and the second set of embossed lines or dots forms an image part of the transitory embossed image.

84. A security document or device according to any one of claims 78 to 83 wherein the second set of embossed lines or dots extends substantially
25 perpendicularly to the first set of embossed lines or dots.

85. A method of forming an optically variable transitory embossed image for a security document or device comprising the steps of applying an optically variable pigment over an area of a substrate, and embossing said area of the

substrate to form an embossed transitory image wherein the embossed transitory image includes a first set of lines or dots extending in one direction and a second set of lines or dots extending in a different direction.

86. A method according to claim 85 wherein substrate includes a
5 transparent window and the embossed transitory image is disposed at least partly in the transparent window.

87. A method according to claim 86 wherein the optically variable
pigment and the embossed transitory image are applied over at least part of the
transparent window and over part of an opaque region surrounding the
10 transparent window.

88. A method according to claim 86 or claim 87 wherein the substrate is
formed from a transparent plastics material to which at least one opacifying
coating is applied to form the opaque region, except in the region of the
transparent window.

89. A method according to any one of claims 85 to 88 wherein the
15 optically variable pigment is applied to one side of the substrate and the
embossing step is performed by embossing the opposite side of the substrate.

90. A method according to any one of claims 85 to 89 wherein the
second set of embossed lines or dots extends substantially perpendicularly to the
20 first set of embossed lines or dots.

91. A security document or device comprising a substrate, a layer of
optically variable or reflective coating applied to an area of the substrate, and an
embossed transitory image formed by embossing in the area of the optically
variable or reflective coating, wherein the security document is formed with a
25 transparent window and the embossed transitory image is at least partly disposed
in the transparent window.

92. A security document or device according to claim 91 wherein the
optically variable or reflective coating and the embossed transitory image are

applied over at least part of the transparent window and over part of an opaque region surrounding the transparent window.

93. A security document or device according to claim 91 or claim 92 wherein the substrate is formed from a transparent plastics material to which at
5 least one opacifying coating has been applied to form the opaque region, except in the region of the transparent window.

94. A security document or device according to any one of claims 91 to 93 wherein the optically variable or reflective coating is applied to one side of the substrate and the opposite side of the substrate is embossed to form the transitory
10 image through the substrate.

95. A security document or device according to any one of claims 91 to 94 wherein the optically variable or reflective coating comprises an optically variable pigment which provides a colour shift between two distinct colours with the colour shift dependent upon viewing angle.

15 96. A security document or device according to any one of claims 91 to 94 wherein the optically variable or reflective coating comprises a reflective metallic ink.

97. A security document or device according to claim 96 wherein the reflective metallic ink comprises any one of silver metallic ink or gold metallic ink.

20 98. A security document or device according to any one of claims 91 to 94 wherein the optically variable or reflective coating comprises a nacreous or pearlescent pigment, such as iriodin.